ORIGINAL RESEARCH ORİJİNAL ARAŞTIRMA

DOI: 10.5336/ophthal.2023-97703

Comparison of Clinical Outcomes and Patient Satisfaction Between Two Different Diffractive Trifocal Intraocular Lenses Implantation: Prospective Clinical Trial

İki Farklı Difraktif Trifokal Göz İçi Lens İmplantasyonunun Klinik Sonuçları ve Hasta Memnuniyetinin Karşılaştırılması: Prospektif Klinik Araştırma

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ABSTRACT Objective: To compare the clinical outcomes and visual quality of subjects undergoing cataract surgery with the implantation of two different models of diffractive trifocal intraocular lenses (IOL). **Material and Methods:** This was a prospective, parallel-group, randomized, comparative, single-masked clinical study. A total of 30 subjects, who were scheduled to undergo bilateral cataract surgery were randomly assigned to two groups: RayOne and PanOptix IOL. The outcome measures were corrected and uncorrected distance visual acuity (CDVA, UDVA) at 4 m, uncorrected intermediate visual acuity (UIVA) at 80 and 60 cm, distance-corrected intermediate visual acuity (DCIVA) at 60 and 80 cm, distance-corrected and uncorrected near visual acuity at 40 cm, and patients' satisfaction. **Results:** Each group comprised 30 eyes of 15 subjects. No statistically significant differences were determined between the groups in terms of CDVA, UDVA, distance-corrected near visual acuity, and uncorrected near visual acuity. The monocular UIVA values at 80 cm were 0.09±0.09 logMAR in the RayOne IOL group and 0.19±0.11 logMAR in the PanOptix IOL group (p=0.01). The UIVA values at 60 cm were better in the PanOptix IOL group (p=0.049,p=0.01, respectively), and the DCIVA at 80 cm were better in the RayOne IOL group (p=0.01,0.047, respectively). The RayOne IOL group had more bothersome halos and starbursts (p=0.026,p=0.01, respectively). **Conclusion:** Both IOLs provided a very good restoration of visual acuity. However, with the PanOptix IOL, the likelihood of subjects experiencing bothersome halos and starbursts was less. The RayOne IOL might be a better choice for subjects that require further intermediate vision.

Keywords: Patient satisfaction; multifocal intraocular lenses; cataract; glare; visual acuity

ÖZET Amaç: İki farklı difraktif trifokal göz içi lens (GİL) implantasyonu ile katarakt ameliyatı olan olguların klinik sonuçları ve görme kalitesinin karşılaştırmak. **Gereç ve Yöntemler:** Bu prospektif, parallel gruplu, randomize, karşılaştırmalı ve tek maskeli bir klinik çalışmaydı. Bilateral katarakt ameliyatı planlanan toplam 30 olgu, RayOne ve PanOptix GİL olmak üzere rastgele iki gruba ayrıldı. Sonuçlar 4 m'den düzeltilmiş ve düzeltilmemiş uzak görme keskinliği [corrected and uncorrected distance visual acuity (CDVA, UDVA)], 80 ve 60 cm'den düzeltilmemiş ara görme keskinliği [uncorrected intermediate visual acuity (UIVA)], 60 ve 80 cm'den düzeltilmiş ara görme keskinliği [distancecorrected intermediate visual acuity (DCIVA)], 40 cm'den düzeltilmiş ve düzeltilmemiş yakın görme keskinliği ve hasta memnuniyeti karşılaştırıldı. **Bulgular:** Gruplara 15 olgunun 30 gözü alındı. CDVA, UDVA, düzeltilmiş yakın görme keskinliği ve düzeltilmemiş yakın görme keskinliği açısından gruplar arasında istatistiksel olarak anlamlı fark saptanmadı. Seksen cm'deki monoküler UIVA değerleri RayOne GİL grubunda 0,09±0,09 logMAR ve PanOptix GİL grubunda 0,19±0,11 logMAR idi (p=0,01). Altmış cm'deki UIVA değerleri PanOptix GİL grubunda daha iyiydi (sırasıyla p=0,049 ve p=0,01), 80 cm'deki DCIVA değerleri RayOne GİL grubunda daha iyiydi (sırasıyla p=0,01. p=0,047). RayOne GİL grubunda haleler ve yıldız patlamalarına daha fazla rastlandı (sırasıyla p=0,026. p=0,01). **Sonuç:** Her iki GİL de çok iyi görme keskinliği restorasyonu sağladı. Bununla birlikte, PanOptix IOL implante edilen olgularda haleler ve yıldız patlamaları daha az görüldü. RayOne GİL, ara mesafe görüşüne daha fazla ihtiyaç duyan olgular için daha iyi bir seçim olabileceğini düşünmekteyiz.

Anahtar Kelimeler: Hasta memnuniyeti; multifokal göz içi lensler; katarakt; parıltı; görme keskinliği

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Peer review under responsibility of Turkiye Klinikleri Journal of Ophthalmology.

Received: 28 Apr 2023 ***Received in revised form:*** 27 Jun 2023 ***Accepted:*** 05 Jul 2023 ***Available online:*** 17 Jul 2023

With the advancements in the cataract surgery technique and intraocular lens (IOL) technologies, patients from this surgery expect to have good vision in the distance and near ranges without using spectacles. The standard IOL design was mono-focal, which offered only fixed focal distance. One of the main factors for dissatisfaction after mono-focal pseudophakic eyes is a lack of accommodation. Previous studies demonstrated that this problem could be resolved using diffractive trifocal IOLs.[1-9] Diffractive trifocal IOLs provide effective near, intermediate, and distance visual restoration, and have been widely used in patients who want to achieve spectacle independence after surgery. However, some possible optical side effects of trifocal IOLs have been reported, including halos and other dysphotopsias, reduced contrast sensitivity, and glare disability, which can significantly affect visual quality and patient satisfaction.[2,8-12]

The RayOne Trifocal (Rayner, Worthing, UK) IOL is a relatively new lens compared to other trifocal IOLs and there are limited studies about it. There is yet no study in the literature that compares intermediate visual acuity at different distances of RayOne Trifocal and AcrySof IQ PanOptix (Alcon Laboratories, Fort Worth, TX, USA) IOLs. The purpose of the current study was principally to compare intermediate visual quality at different distances and clinical outcomes in subjects undergoing cataract surgery with the implantation of two different models of diffractive trifocal IOLs: RayOne Trifocal and AcrySof IQ PanOptix.

MATERIAL AND METHODS

This was a prospective, single-center, parallel-group, randomized, single-masked (subjects) clinical study. Approval was obtained from the local ethics committee of Akdeniz University Faculty of Medicine where the study was conducted in compliance with the ethical standards set out in the Declaration of Helsinki (date: November 25, 2020, no: KAEK-896). Before the participants were included in the study, their written informed consent was obtained. The study was registered under the World Health Organization international clinical trials registry platform: NCT04655274, 30/11/2020

The study included subjects who were scheduled for routine bilateral cataract surgery and IOL implantation. Subjects involved in the study were grouped 1:1 to receive either the PanOptix IOL (30 eyes, 15 subjects) or RayOne IOL (30 eyes, 15 subjects) according to a randomization table. Patients were randomly assigned to receive using a randomization system (www.random.org). The primary outcome measure was binocular distance-corrected intermediate visual acuity (DCIVA) at 80 cm. Secondary outcomes included monocular and binocular corrected and uncorrected distance visual acuity (CDVA, UDVA) at 4 m, monocular and binocular DCIVA at 60 cm, monocular and binocular uncorrected intermediate visual acuity (UIVA) at 60 and 80 cm, monocular and binocular distance-corrected and UDVA near visual acuity distance-corrected near visual acuity (DCNVA) and uncorrected near visual acuity (UNVA) at 40 cm, and comparison of manifest spherical equivalent, bifocal defocus curve measurement and patients' satisfaction.

The inclusion criteria for the study were undergoing cataract surgery with trifocal IOL implantation in both eyes, being 40 years or older, having visually significant cataract complaints [poor preoperative visual acuity (0.2 logarithms of the minimum angle of resolution "logMAR" or lower), light scattering, etc.], and refractive lens exchange as a secondary outcome. The exclusion criteria were as follows: preoperative regular corneal astigmatism >1.00 diopter (D), irregular corneal astigmatism, amblyopia, axial length (AL) over 25 mm, previous history of corneal or refractive surgery, ocular comorbidity [corneal scars, keratoconus, and corneal endothelial dystrophy, chronic or recurrent uveitis, macular degeneration, diabetes mellitus with retinal changes, glaucoma or intraocular pressure (IOP) equal or higher than 24 mmHg], and inability to understand and/or complete patient questionnaires.

IOLs

The AcrySof IQ PanOptix trifocal is a single-piece aspheric IOLs made of hydrophobic acrylic material. The optical zone is in the center 4.5 mm of the anterior surface with 15 diffractive steps and has an outer refractive step from 4.5 to 6 mm. The RayOne trifo-

TABLE 1: Comparison of optical features of the RayOne and AcrySof IQ PanOptix IOLs.

	RayOne Trifocal	AcrySof IQ PanOptix Trifocal
Optic material	Rayacryl hydrophilic acrylic	Hydrophobic acrylate
Optical design	Diffractive	Diffractive-refractive hybrid
Addition (near/intermediate)	+3.50 D/+1.75 D	+3.25 D/+2.17 D
Overall diameter (mm)	12.5	13
Optical diameter (mm)	6	6
Diffractive zone (mm)	4.5	4.5
Estimated A-constant (SRK/T, optical biometry)	118.6	119.1
Range	+6.0 to +34.0 D	+6.0 to +34.0 D
Percentage light energy split (3-mm pupil)	Distance: 52%, intermediate: 22%, near: 26%	Distance: 42%, intermediate: 24%, near: 22%

cal is a single-piece aspheric IOLs made of hydrophilic acrylic material. The optical zone is in the center 4.5 mm of the anterior surface with 16 diffractive steps. The technical specifications of the two IOLs are summarized in Table 1.

EXAMINATION AND SURGICAL PROTOCOL

The study consisted of a complete eye exam preoperatively within 30 days before surgery; and a postoperative visit one day, one week, one month, and three months after surgery. This paper reports the 3-month postoperative results after the second eye surgery. Preoperatively, all the subjects underwent a comprehensive ophthalmologic examination, including the measurements of objective refraction (KR-8900; Topcon, Tokyo, Japan), UDVA, and CDVA at 4 m using logMAR acuity charts under photopic conditions (lighting levels of 85 candela/m^2), IOP (Full Auto Tonometer TX-F; Topcon), optical biometry (IOL Master 500; Carl Zeiss Meditec AG, Jena, Germany), corneal topographic evaluation (Pentacam; Oculus, Wetzlar, Germany), slit lamp examination of the anterior segment, and dilated fundus examination. The manifest spherical equivalent value is calculated by adding the sum of the sphere power with half of the cylinder power. The IOL power was based on biometry data measured and calculated using different formulae according to AL (Hoffer Q for AL<22 mm; SRK/T for AL≥22 mm), considering emmetropia or the closest myopic value to emmetropia.

All the subjects underwent an uneventful phacoemulsification with a sutureless incision of 2.2 mm followed by IOL implantation by a single surgeon (M.U.) between October 2020 and December 2020. The surgery of the second eye was performed within 15 days of the first surgery. Informed consent was obtained from all the subjects before data collection. The subjects were prescribed postoperative medications in the form of combined antibiotics and corticosteroids drops (0.5% moxifloxacin and 0.1% dexamethasone) and nonsteroidal anti-inflammatory drops (3% nepafenac) four times a day for one month.

Postoperatively, monocular and binocular UDVA and CDVA, DCIVA and UIVA at 60 and 80 cm, DCNVA and UNVA at 40 cm were evaluated and subjective refraction was measured. VAs were assessed using logMAR acuity charts under photopic conditions (85 candela/m^2). A corneal topography examination including the assessment of the corneal status and IOL position (centration, tilt, and axis position) was undertaken subjectively under a slit lamp. The binocular defocus curve was evaluated under photopic conditions (85 candela/m^2) using defocusing lenses from +1.00 D to -4.00 D in 0.50 D steps of a blur. All the subjects were administered the short questionnaire, which is prepared by us, to determine glare, halos, and starbursts conditions at three months postoperatively. Subjects score each item (never, occasionally, quite often, or very often) on how frequent, severe, and bothersome.

STATISTICAL ANALYSIS

This study is designed to be a non-inferiority trial of a new IOL (ie, one IOL is not inferior to the other in visual acuity outcomes). The sample size calculation was based on the primary outcome of monocular

UIVA at 80 cm. Assuming a type I error of 0.05, a power of 80%, a minimum detectable difference of one line of visual acuity (0.1 logMAR), and an estimated standard deviation of visual acuity of 0.10 logMAR in each group. It was calculated that a minimum of 13 subjects were required in each group.

Statistical analyses were performed using IBM SPSS version 21.0 (SPSS Inc., IL-USA). To define the sample, continuous variables were expressed as mean±standard deviation, median (minimum-maximum), and categorical variables as numbers and percentages. The normality assumption for the independent variables was checked with the Shapiro-Wilk test. In the comparison of continuous data, the Mann-Whitney U test was applied to the non-normally distributed data and the independent-samples *t*-test was to the data with normal distribution. Categorical variants were assessed with the Pearson chi-square test and Fisher's exact test. The results were evaluated at the 95% confidence interval, and a p value of <0.05 was considered statistically significant.

RESULTS

The study evaluated 60 eyes of 30 subjects with an age range from 42 to 78 years. Each IOL group (RayOne and PanOptix) included 30 eyes (Figure 1). No statistically significant difference was determined in the preoperative data between the groups in respect of age, sex, IOP, and AL (Table 2).

Table 3 summarizes the postoperative third-month visual and refractive data of the two IOL groups. We achieved satisfactory visual results in both IOL groups. Statistically significant differences were detected only in intermediate vision. The monocular and binocular UIVA values at 60 cm were significantly better in the PanOptix IOL group (95% Cl 0.15-0.25, p=0.049 and 95% Cl 0.12-0.19, p=0.01, respectively), while the monocular UIVA at 80 cm, binocular UIVA at 80 cm, monocular DCIVA at 80 cm and binocular DCIVA at 80 cm were significantly better in the RayOne IOL group (95% Cl 0.05-0.14, p=0.01; 95% Cl 0.04-0.11, p=0.047; 95% Cl 0.03-0.11, p<0.001; and 95% Cl 0.04-0.08, p=0.042, respectively).

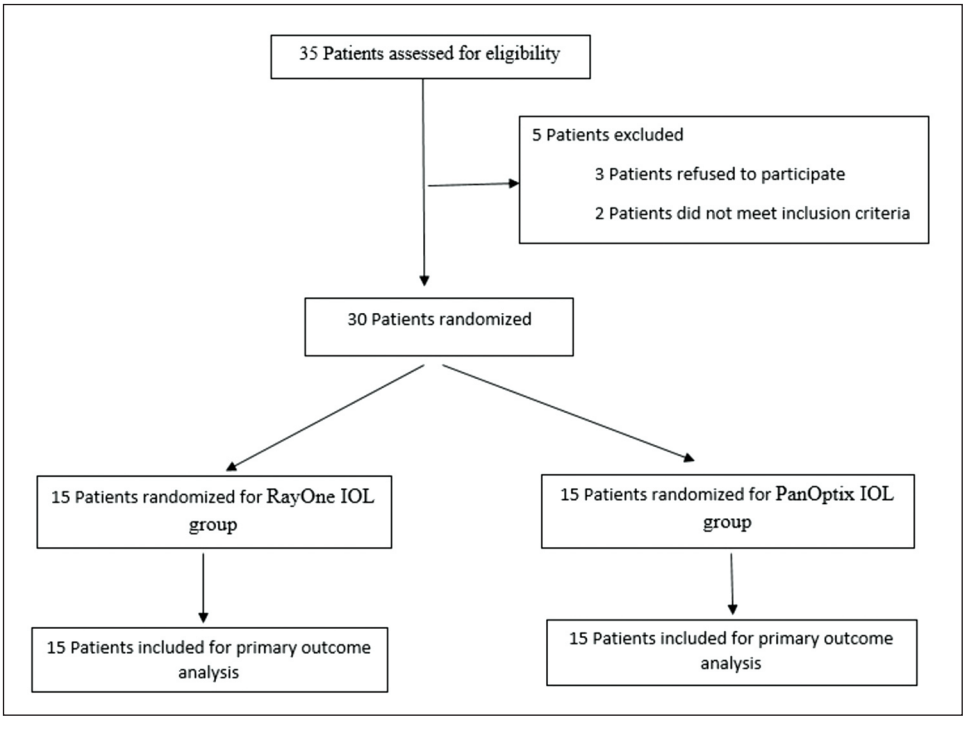

FIGURE 1: Randomization figure.

TABLE 2: Preoperative clinical data and comparison between the IOL groups.

	RayOne IOL Group	PanOptix IOL Group	p value
Eye (n)	30	30	
Age	60.13±9.89 (range, 50-70)	62.8±8.9 (range, 50-70)	0.97
Gender (Female/male)	15/15	15/15	
Preoperative CDVA (logMAR)	0.51±0.4 (range, 0.20-1.30)	0.42±0.24 (range, 0.20-1.30)	0.17
Preoperative manifest spherical equivalent (D)	-0.16±0.54 (range, -0.75, 1.25)	-0.21±0.96 (range, -0.75, 1.50)	0.615
Intraocular pressure	13.87±2.92 (range, 10-18)	13.23±3.51 (range, 10-19)	0.293
Axial length (mm)	23.4±0.96 (range, 21.01, 24.21)	23.62±0.66 (range, 21.20-23.95)	0.456
IOL power (D)	20.8±2.61 (range, 19.5, 24.00)	20.93±2.71 (range, 19.5, 24.00)	0.975

IOL: Intraocular lens; CDVA: Corrected distance visual acuity; D: Diopter.

TABLE 3: Comparison of the visual acuity and refractive errors of the IOL groups at the postoperative third month.

		RayOne IOL Group		PanOptix IOL Group			
		X̄±SD	Range	X̄±SD	Range	95% CI	p value
UDVA (logMAR)	Monocular	0.07±0.09	-0.20, 0.30	0.057±0.06	-0.10, 0.20	0.03-0.12	0.956
	Binocular	0.02±0.04	-0.16, 0.15	0.01±0.13	-0.05, 0.10	-0.01-0.04	0.308
CDVA (logMAR)	Monocular	0.04±0.06	-0.10, 0.20	0.02±0.07	-0.10, 0.20	0.01-0.07	0.09
	Binocular	0.02±0.06	-0.20, 0.10	0±0.04	-0.05, 0.10	-0.01-0.05	0.989
UIVA at 60 cm (logMAR)	Monocular	0.2±0.1	0.10, 0.40	0.13±0.2	0.00, 0.30	0.15-0.25	0.049*
	Binocular	0.15±0.07	0.10, 0.20	0.08±0.04	-0.10, 0.10	0.12-0.19	0.01*
DCIVA at 60 cm (logMAR)	Monocular	0.12±0.13	0.10, 0.30	0.06±0.08	0.00, 0.10	0.05-0.19	0.059
	Binocular	0.09±0.03	-0.10, 0.10	0.04±0.03	-0.10, 0.10	0.08-0.11	0.217
UIVA at 80 cm (logMAR)	Monocular	0.09±0.09	-0.10, 0.20	0.19±0.11	0.10, 0.40	0.05-0.14	0.01*
	Binocular	0.07±0.07	-0.10, 0.10	0.12±0.14	0.10, 0.30	0.04-0.11	0.047*
DCIVA at 80 cm (logMAR)	Monocular	0.07±0.08	-0.10, 0.20	0.17±0.09	0.10, 0.30	0.03-0.11	<0.001*
	Binocular	0.06±0.04	-0.10, 0.10	0.1±0.04	0.00, 0.20	0.04-0.08	0.042*
UNVA (logMAR)	Monocular	0.07±0.12	-0.10, 0.30	0.05±0.05	0.00, 0.30	0.01-0.13	0.108
	Binocular	0.02±0.03	-0.14, 0.10	0.03±0.04	-0.10, 0.20	0.01-0.04	0.16
DCNVA (logMAR)	Monocular	0.07±0.11	-0.14, 0.20	0.06±0.17	-0.10, 0.30	0.01-0.13	0.061
	Binocular	0.01±0.12	-0.16, 0.30	0.01±0.09	-0.10, 0.15	-0.05-0.07	0.781
Postoperative manifest spherical equivalent (D)		-0.05±0.11	-0.50, 0.50	0.03±0.16	-0.50, 0.50	-0.10-0.01	0.831

IOL: Intraocular lens; CI: Confidence interval; SD: Standard deviation; UDVA: Uncorrected distance visual acuity; CDVA: Corrected distance visual acuity; UIVA: Uncorrected intermediate visual acuity; DCIVA: Distance-corrected intermediate visual acuity; UNVA: Uncorrected near visual acuity; DCNVA: Distance-corrected near visual acuity; D: Diopter.
*:p< 0.05.

Postoperative refractive cylinder and manifest spherical equivalent were similar in both groups (95% Cl 0.17-0.49, *p*=0.732 and 95% CI -0.10-0.01, *p*=0.831, respectively) (Figure 2).

UDVA was 0.3 logMAR (Snellen equivalent 20/40) or better in all the eyes (100%) in the PanOptix IOL group and 28 eyes (93.3%) in the RayOne IOL group and 0.1 logMAR or better in 21 eyes (70%) in the PanOptix IOL group and 18 eyes (60%) in the RayOne IOL group. UIVA at 60 cm was 0.3 logMAR or better in 28 eyes (93.3%) in the PanOptix IOL group and 25 eyes (83.3%) in the RayOne IOL group and 0.1 logMAR or better in 22 eyes (73.3%) in the PanOptix IOL group and 15 eyes (50%) in the RayOne IOL group. UIVA at 80 cm was 0.3 logMAR or better in 28 eyes (93.3%) in the PanOptix IOL group and 30 eyes (100%) in the RayOne IOL group and 0.1 logMAR or better in 18 eyes (60%) in the PanOptix IOL Group and 24 eyes (80%) in the RayOne IOL group (Figure 3). UNVA at 40 cm was 0.3 logMAR or better in 29 eyes in the PanOptix IOL group and 26 eyes (86.7%) in the Ray-

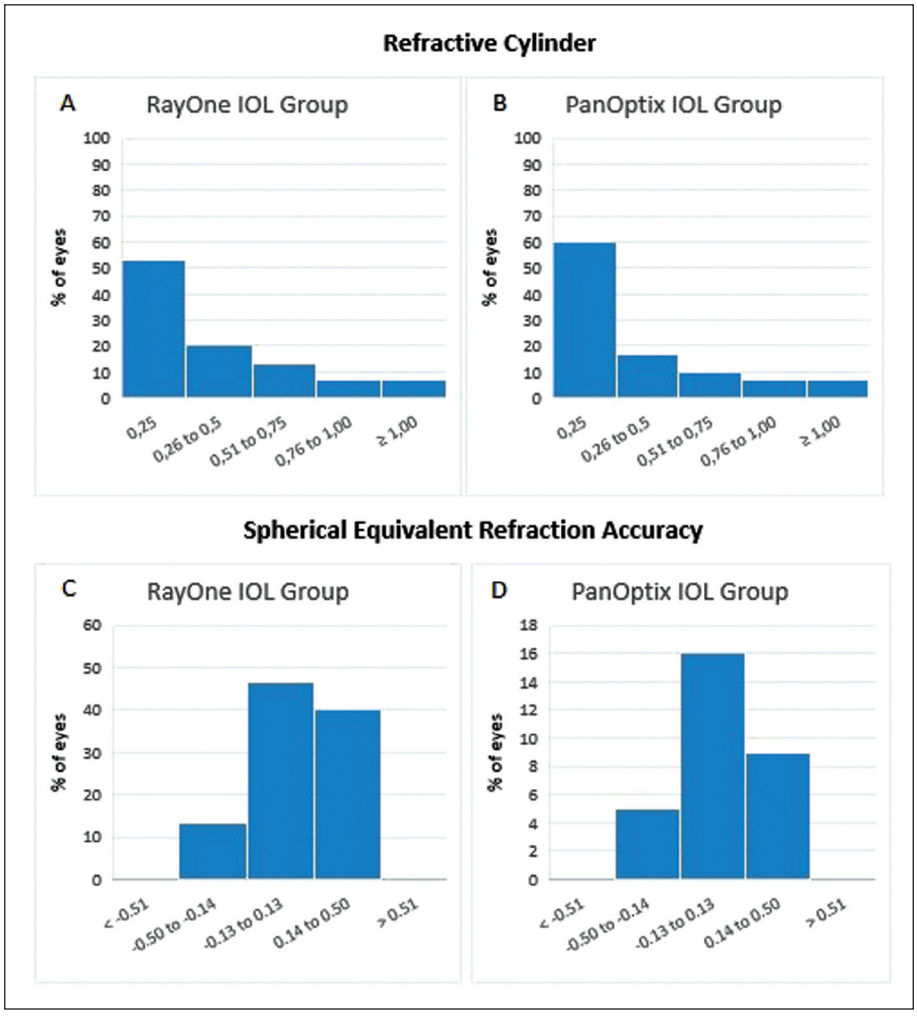

FIGURE 2: The 3-month postoperative refractive cylinder (**A:** RayOne IOL group and **B:** PanOptix IOL group) and manifest spherical equivalent (**C:** RayOne IOL group and **D:** PanOptix IOL group) accuracy.

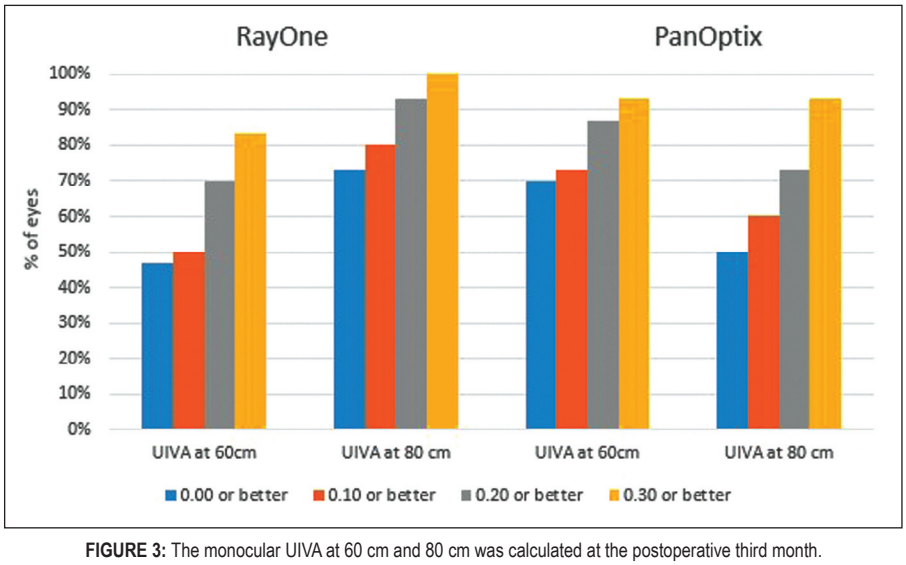

FIGURE 3: The monocular UIVA at 60 cm and 80 cm was calculated at the postoperative third month.
UIVA: Uncorrected intermediate visual acuity.

One IOL group and 0.1 logMAR or better in 27 (90%) eyes in the PanOptix IOL group and 25 (83%) eyes in the RayOne IOL group.

The bifocal defocus curves under photopic conditions for each group are presented in Figure 4. Both curves were almost overlapping; peak VA occurred at 0.0 D and no statistically significant differences were found (95% CI -0.11-0.04, p=0.595). None of the operations was eventful, and no intraoperative and/or postoperative complication was observed. None of patients had posterior capsule opacity.

Visual quality was evaluated using the short questionnaire in each group. The scores of all three symptoms for each group are presented in Figure 5.

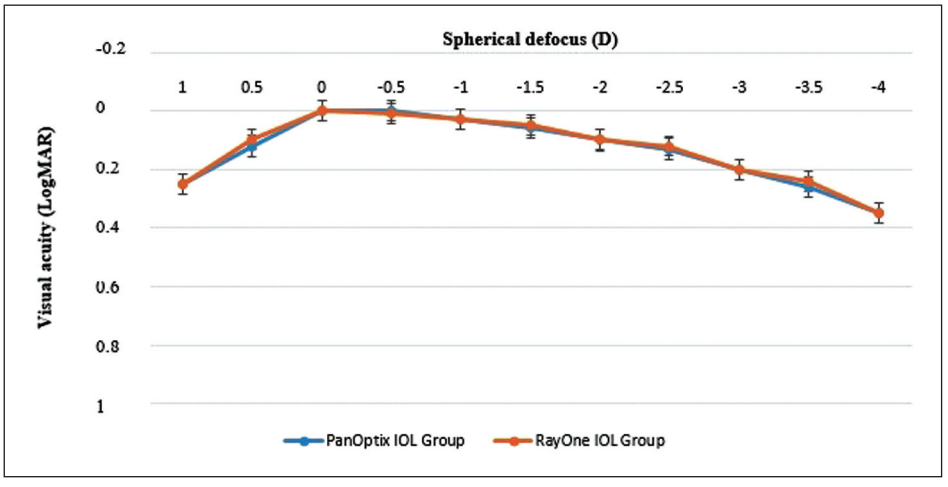

FIGURE 4: The binocular defocus curve was calculated at the postoperative third month.

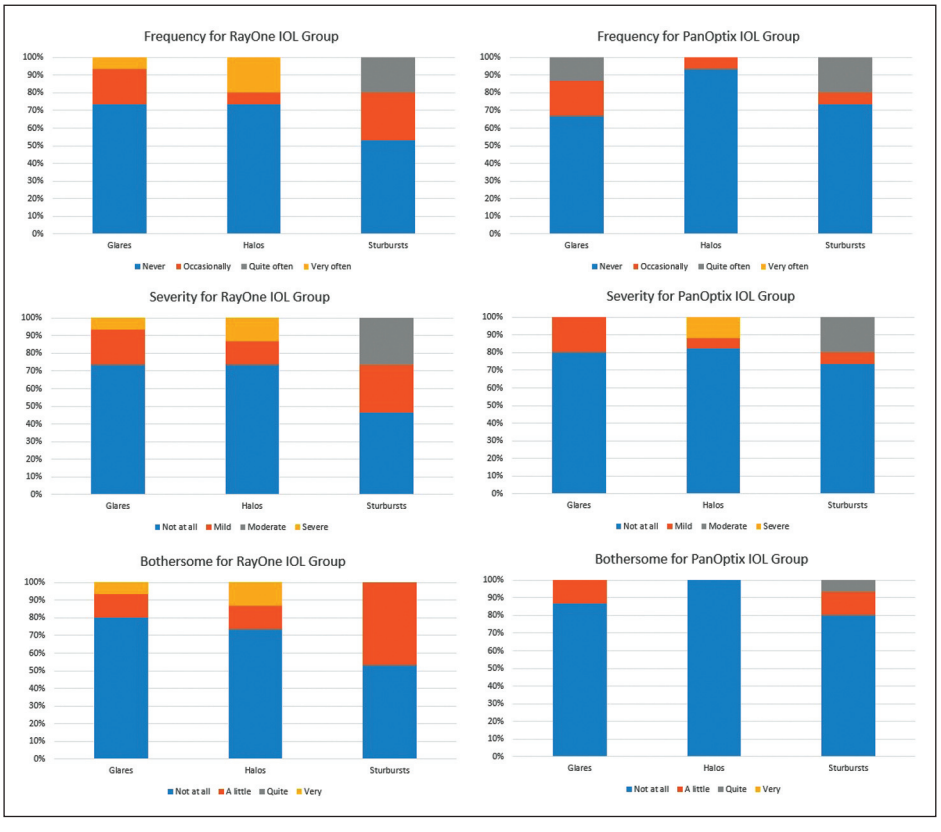

FIGURE 5: Frequency, severity, and bothersome nature of visual disturbances at the postoperative third month.

The most prevalent complaint in the RayOne IOL group was starbursts (53.3%), but the majority (80%) considered it to cause minimal or no discomfort (scores: 0-1). The most prevalent complaint in the PanOptix IOL group was glare (33.3%), but the majority (86.7%) considered it to cause only minimal or no discomfort (scores: 0-1). No statistically significant difference was found between the two groups regarding the frequency and severity of visual symptoms evaluated. Regarding discomfort, there were statistically significant differences in the halo and starburst complaints of the two groups (p=0.026 and p=0.01, respectively). More subjects in the RayOne IOL group complained about these visual problems.

DISCUSSION

With the advances in the cataract surgery technique and IOL technologies, postoperative visual quality has become a top priority for research. Trifocal IOLs aim to provide good vision at far, near, and, intermediate distances, thus reducing spectacle dependence. This study was designed to compare the VA and visual quality obtained from two models of commercially available diffractive trifocal IOLs: RayOne Trifocal and AcrySof IQ PanOptix. Regarding the VA results, our study confirmed previous research in that the trifocal IOLs provided good visual and optical outcomes for all distances and allowed the subjects to be independent of spectacles for the majority of daily activities.

In the RayOne and PanOptix IOL groups, the mean postoperative third-month monocular logMAR UDVA values were 0.07±0.09 and 0.057±0.06, respectively and the binocular logMAR UDVA values were 0.02±0.04 and 0.01±0.13, respectively. These results are similar to those previously reported for a variety of diffractive trifocal IOLs.[1,6,13,14] Concerning near vision, the mean monocular logMAR UNVA values were 0.07±0.12 and 0.02±0.05 and the binocular logMAR UNVA values were 0.02±0.03 and 0.01±0.04 in the RayOne IOL group and PanOptix IOL group, respectively. This is also consistent with the literature.[1,3,13,14] Although monocular/binocular distance and near VA appeared to be slightly better in the PanOptix IOL group at the third-month follow-up, they did not statistically significantly different compared to the RayOne IOL group.

Although the VA values at both near and far distances in the third month were similar between the two IOL groups, statistically significant differences were detected in intermediate vision. UIVA at 60 cm was better in the PanOptix IOL group while UIVA and DCIVA at 80 cm were better in the RayOne IOL group. A recent study comparing the visual outcomes of the AcrySof IQ PanOptix, RayOne trifocal, and FineVision POD F IOLs in 90 eyes found that all the IOLs provided similar intermediate vision at 66 cm.[14] Another study comparing the RayOne trifocal and FineVision POD F IOLs found that both provided similar intermediate vision at 80 cm.[13] Previous studies demonstrated that the AcrySof IQ PanOptix IOL produced better results for closer vision requirements (60 cm).[7,15] Similar to previous studies, we demonstrated that the AcrySof IQ PanOptix IOL provided better intermediate vision at 60 cm, and the RayOne Trifocal IOL provided better intermediate vision at 80 cm.

In the current study, refractive results were good. The postoperative manifest spherical equivalent was similar in these groups. These findings are consistent with the results of previous studies evaluating the same or other types of trifocal IOLs.[1,6,13,16]

In this study, we used a short questionnaire to determine the subject's perception of visual disturbance. Glare, halos, and starbursts were the visual disturbances in both groups with similar frequency and severity. The RayOne IOL group reported experiencing more bothersome halos and starbursts, and the difference between the two groups was statistically significant. In a previous similar study, no significant difference was found between the RayOne IOL and AcrySof IQ PanOptix IOLs in terms of visual complaints.[14] In another study RayOne IOL reported higher satisfaction with regards to glare problems than AcrySof IQ PanOptix IOLs; although these differences were not statistically significant.[17]

It has been suggested that the differences in photic phenomena may be related to the different optical designs of the ring zones of trifocal IOLs.[16,18] On the other hand, in our study, we evaluated the results

in the postoperative third month, by which the neural adaptation process had probably not yet been completed.[19,20]

Our study has certain limitations. First, the sample size was relatively small, which may affect the generalizability of the results. Second, the study had a short follow-up duration, and results may differ over a longer period. Third, contrast sensitivity test was not evaluated. However, considering the scarcity of available studies assessing the clinical performance of RayOne Trifocal IOLs, we think that the data reported in this study are important.

CONCLUSION

When the performance of the RayOne Trifocal IOL and the AcrySof IQ PanOptix IOL was compared, it was determined that both provided very good restoration near, intermediate, and far VA at the third month postoperatively. However, in the AcrySof IQ PanOptix IOL group, the subjects were less likely to experience bothersome halos and starbursts and had a better closer intermediate vision. The RayOne Trifocal IOL may be a better choice for subjects who require further intermediate vision (80 cm) and AcrySof IQ PanOptix IOL may be a better choice for subjects who require closer intermediate vision (60 cm). Therefore, it should be determined according to the patient's need for intermediate vision. The findings from this study indicate that both trifocal IOLs present effective options for subjects undergoing cataract surgery who would be satisfied with a low rate of visual disturbances and a good range of vision. Future prospective studies may provide us with more detailed and detailed information on this subject.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Mustafa Ünal;* ***Design:*** *Mustafa Ünal, Aslı Çetinkaya Yaprak;* ***Control/Supervision:*** *Mustafa Ünal;* ***Data Collection and/or Processing:*** *Aslı Çetinkaya Yaprak;* ***Analysis and/or Interpretation:*** *Aslı Çetinkaya Yaprak;* ***Literature Review:*** *Aslı Çetinkaya Yaprak;* ***Writing the Article:*** *Mustafa Ünal;* ***Critical Review:*** *Mustafa Ünal;* ***References and Fundings:*** *Mustafa Ünal, Aslı Çetinkaya Yaprak;* ***Materials:*** *Mustafa Ünal, Aslı Çetinkaya Yaprak.*

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